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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/748,023	12/30/2003	Muthiah Venkateswaran	TI-36587 (032350.B568)	6463
23494	7590	07/26/2005	EXAMINER	
TEXAS INSTRUMENTS INCORPORATED P O BOX 655474, M/S 3999 DALLAS, TX 75265			ANDUJAR, LEONARDO	
			ART UNIT	PAPER NUMBER
			2826	

DATE MAILED: 07/26/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

H.A

<b>Office Action Summary</b>	<b>Application No.</b> 10/748,023	<b>Applicant(s)</b> VENKATESWARAN, MUTHIAH	
	<b>Examiner</b> Leonardo Andújar	<b>Art Unit</b> 2826	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 30 December 2003.
- 2a) ☐ This action is FINAL.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 112*

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1, 11 and 20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Regarding claim 1, the claim recites in line 3 that the underfill is a no flow underfill material. However, it is suggested in lines 15-16 that the underfill flows into the area located between the plurality of bumps. This interpretation is supported by applicant figs. 2C-E that show the underfill flowing. It is not clear if the underfill is a fluid or not. Regarding claim 11, the claim recites in line 5 that the underfill is a no flow underfill material. However, it is suggested in lines 23-24 that the underfill flows into the area located between the plurality of bumps. This interpretation of the claim language is supported by applicant's figs. 2C-E that show the underfill flowing. It is not clear if the underfill is a fluid or not. Regarding claim 20, the claim recites in line 3 that the underfill is a no flow underfill material. However, the claim 20 recites in line 21 that the underfill flows. It is not clear if the underfill is a fluid or not.

Appropriate correction required.

3. The following is a quotation of the fourth paragraph of 35 U.S.C. 112:

Subject to the following paragraph, a claim in dependent form shall contain a reference to a claim previously set forth and then specify a further limitation of the subject matter claimed. A claim in dependent form shall be construed to incorporate by reference all the limitations of the claim to which it refers.

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4. Claims 4, 5, 14 and 15 are rejected under 35 U.S.C 112, fourth paragraph, as being an improper dependent claim for failing to include every limitation of a claim from which it depends.

5. The limitations in claims 4 and 5, infringe the limitations in basic claim 1. Claim 1 recites that the underfill is a no flow underfill material in line 3. However, claims 4 (lines 5-7) and claim 5, (lines 9-10) recite that the underfill flows.

1. The limitations in claims 14 and 15, infringe the limitations in basic claim 11. Claim 11 recites that the underfill is a no flow underfill material in line 5. However, claims 14 (lines 5-7) and claim 5, (lines 9-10) recite that the underfill flows.

### ***Claim Rejections***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Initially, and with respect to claim 11-18, note that a "product by process" claim is directed to the product per se, no matter how actually made. See In re Thorpe et al., 227 USPQ 964 (CAFC, 1985) and the related case law cited therein which makes it

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clear that it is the final product per se which must be determined in a "product by process" claim, and not the patentability of the process, and that, as here, an old or obvious product produced by a new method is not patentable as a product, whether claimed in "product by process" claims or not. As stated in Thorpe, even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. In re Brown, 459 F.2d 531, 535, 173 USPQ 685, 688 (CCPA 1972); In re Pilkington, 411 F.2d 1345, 1348, 162 USPQ 145, 147 (CCPA 1969); Buono v. Yankee Maid Dress Corp., 77 F.2d 274, 279, 26 USPQ 57, 61 (2d. Cir. 1935). Note that Applicant has burden of proof in such cases as the above case law makes clear.

9. Claims 11, 12 and 14-19 are rejected under 35 U.S.C. § 102(b) as being anticipated by, or in the alternative, under 35 U.S.C. 103(a) as obvious over Murakami (US 6,069,024).

10. Regarding claims 11, 12 and 14-18 (as understood), Murakami (e.g. fig.4) shows an underfilled chip packaged comprising: a substrate surface 1; a die 4 having a plurality of solder bumps 6 attached thereto, an a layer of no-flow underfill material 3 disposed generally between the die and the substrate wherein the underfill is formed between the plurality of bumps. Also, the bumps are in contacts with the surface of the substrate. As to the grounds of rejection under section 103(a), the method for forming the chip package such as that recited in claim 11/lines 7-24, the process recited in claims 12 and 14-18, are intermediate process steps that does not affect the structure of

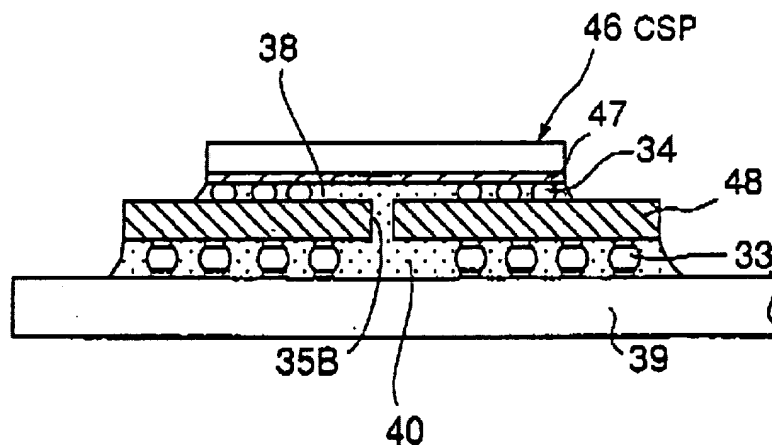
the final device. See MPEP § 2113, which discusses the handling of "product by process" claims and

11. Regarding claim 19, Murakami shows that the underfilled package is an underfilled flip chip package.

12. Claims 11 –19 are rejected under 35 U.S.C. § 102(b) as being anticipated by, or in the alternative, under 35 U.S.C. 103(a) as obvious over Taniguchi et al. (US 6,404,062).

13. Regarding claims 11, 12 and 14-18 (as understood), Taniguchi (e.g. fig.14) shows an underfilled chip packaged comprising: a substrate surface 48; a die 4 having a plurality of solder bumps 34 attached thereto, an a layer of no-flow underfill material 40 disposed generally between the die and the substrate wherein the underfill is formed between the plurality of bumps. Also, the bumps are in contacts with the surface of the substrate. As to the grounds of rejection under section 103(a), the method for forming the chip package such as that recited in claim 11/lines 7-24, the process recited in claims 12 and 14-18, are intermediate process steps that does not affect the structure of the final device. See MPEP § 2113, which discusses the handling of "product by process" claims and recommends the alternative (§ 102 / § 103) grounds of rejection.

FIG.14



14. Regarding claim 13, Taniguchi (e.g. fig.14) shows that the packing substrate is connected to a printed circuit board 39. As to the grounds of rejection under section 103(a), the process used to connect the solder bumps such as heated reflow process, is an intermediate process step that does not affect the structure of the final device. See MPEP § 2113, which discusses the handling of "product by process" claims and recommends the alternative (§ 102 / § 103) grounds of rejection.

15. Regarding claim 19, Taniguchi shows that the underfilled package is an underfilled flip chip package.

16. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Murakami (US 6,069,024) in view of Taniguchi (US 6,404,062).

17. Regarding claim 13, Murakami teaches most aspects of the instant invention except for a packing substrate connected to a printed circuit board. Therefore, Murakami does not teach that the packaging substrate is connected to a printer circuit

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board by a reflow process. Nevertheless, Taniguchi (e.g. fig.14) shows a packing substrate 48 connected to a printed circuit board 39. In regards to the process used to connect the packaging substrate to the printed circuit board such as heated reflow process, this is an intermediate process step that does not affect the structure of the final device. It would have been obvious to one of ordinary skill in the art at the time the invention was made to connect the packaging substrate disclosed by Murakami to a printed circuit board in accordance to Taniguchi's invention to provide support to the chip packaged, a heat transfer medium as well to integrate the chip package with an electronic system.

#### ***Allowable Subject Matter***

18. Claims 1 and 20 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, 2<sup>nd</sup> paragraph, set forth in this Office action.

19. Claims 4 and 5 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2<sup>nd</sup> paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

#### ***Conclusion***

20. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Jiang teaches embodiments similar to the instant invention.

21. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leonardo Andújar whose telephone number is 571-272-1912. The examiner can normally be reached on Mon through Thu from 9:00 AM to 7:30 PM EST.




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22. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan J. Flynn can be reached on 571-272-1915. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

23. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Leonardo Andújar  
Patent Examiner  
Art Unit 2826  
06/16/2005



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